

CLAIMS

1. A gate or door closing hinge (1) comprising:

- a first hinge part (2);
- a second hinge part (3);
- 5 – a hinge shaft (10) rotatably mounted about a first rotation axis (15) in the first hinge part (2) and connecting the first hinge part (2) to the second hinge part (3);
- a torsion spring (18) having a longitudinal axis coinciding substantially with said first rotation axis (15) and having a first end (19) fixed with respect to the first hinge part (2) and a second end (20) fixed with respect to the hinge shaft (10) to exert a moment onto the first hinge part (2); and
- 10 – means (21, 24) for adjusting the moment exerted by the torsion spring (18) on the first hinge part (2),
- 15 characterised in that
said adjusting means (21, 24) comprise:
 - a coupling element (21) which is interposed between the first end (19) of the torsion spring (18) and the first hinge part (2) and which is rotatably mounted in the first hinge part (2) about a second rotation axis (23) which coincides substantially with the first rotation axis (15);
 - 20 and
 - a screw-like element (24) which is rotatably mounted in the first hinge part (2) about a third rotation axis (25) and which has a screw threaded portion (26) arranged to co-operate with the coupling element (21) to rotate the coupling element (21) with respect to the first hinge part (2) upon rotation of the screw-like element (24) about the third rotation axis (25) so as to adjust the moment exerted by the torsion spring (18) on the first hinge part (2).
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2. A hinge according to claim 1, characterised in that the third rotation axis (25) does not coincide with the first rotation axis (15).

3. A hinge according to claim 1 or 2, characterised in that the screw threaded portion (26) of the screw-like element (24) has such a step that, for one rotation of the screw-like element (24) over 360°, the coupling element (21) rotates over an angle of less than 36°, preferably over an angle of less than 18°.

4. A hinge according to any one of the claims 1 to 3, characterised in that the coupling element (21) has a helical guide, in particular a helical groove (30), extending around the second rotation axis (23) and the screw-like element (24) co-operates with the coupling element (21) through the intermediary of a guided element (29) arranged to move along said helical guide (30) upon rotation of the screw-like element (24) to rotate the helical guide (30) and hence the coupling element (21) with respect to the first hinge part (2).

5. A hinge according to claim 4, characterised in that the guided element (29) has an internally screw-threaded hole (28) co-operating with the screw-threaded portion (26) of the screw-like element (24) to move the guided element (29) along the helical guide (30) upon rotation of the screw-like element (24).

6. A hinge according to claim 5, characterised in that the first hinge part (2) comprises a substantially linear guide (31) for said guided element (29), which linear guide (31) extends in a direction substantially parallel to the third rotation axis (25).

7. A hinge according to any one of the claims 1 to 6, characterised in that the third rotation axis (25) is substantially parallel to the first rotation axis (15).

8. A hinge according to any one of the claims 1 to 3, characterised in that the coupling element (21) comprises a worm wheel

(39), the screw threaded portion (26) of the screw-like element (24) forming a worm co-operating with the worm wheel (39) of the coupling element (21) to rotate the coupling element (21) with respect to the first hinge (2) upon rotation of the screw-like element (24).

5 9. A hinge according to claim 8, characterised in that the third rotation axis (25) extends substantially at right angles to the first rotation axis (15).

10 10. A hinge according to any one of the claims 1 to 9, characterised in that rotation of the first hinge part (2) with respect to the hinge shaft (2) under the moment exerted by the torsion spring (18) on the first hinge part (2) is limited to a predetermined mutual angular position by mutually co-operating stop means (32, 35) on the first hinge part (2) and on the hinge shaft (10), the moment exerted by the torsion spring (18) on the first hinge part (2) being of a minimum value in said
15 predetermined mutual angular position and increases when rotating the first hinge part (2) in a first rotational direction (37) with respect to the hinge shaft (10).

20 11. A hinge according to claim 10, characterised in that the hinge shaft (10) is rotatably mounted on the second hinge part (3), and the hinge shaft (10) is provided with a stop (36) for limiting rotation of the hinge shaft (10) in said first rotational direction (37) with respect to the second hinge part (3) to a predetermined mutual angular position and for enabling rotation of the hinge shaft (10) with respect to the second hinge part (3) in a second rotational direction opposite the first rotational
25 direction (37).

12. A hinge according to any one of the claims 1 to 11, characterised in that the first hinge part(2) comprises a tubular housing (12) enclosing at least the hinge shaft (10), the torsion spring (18) and the coupling element (21), the tubular housing (12) of the first hinge part

(2) being in particular arranged to be mounted in a tubular element fixed against the door or gate (4) or in a tubular frame member (11) of the gate or door (4) itself.